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ABSTRACT

This Technical Committee Report prepared by industry representatives in Idaho lists the skills currently necessary for an employee in that state to obtain a job in printing and graphic arts technology, retain a job once hired, and advance in that occupational field. (Task lists are grouped according to duty areas generally used in industry settings, and are used as the basis for modules in the statewide curriculum guide development process and for generating student profiles.) The first section of the guide is the task profile, which provides the Idaho code number for the occupation and outlines major concepts/content, laboratory activities, teaching considerations, and intended outcomes. The guide then lists the following 20 task areas with subtasks (competencies) for printing and graphic arts technology: employability skills; introduction to the printing industry; paper; clerical administrative support operations; mechanical and creative support operations; pre-press operations; offset press operations; finishing and binding operations; reproduction process operations; estimating operations; graphic design operations; typographical operations; copy preparation operations; line photographic operations; graphic arts halftone operations; color reproduction operations; stripping operations; proofing and platemaking operations; offset operations; and finishing operations. (KC)

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ED346274

Vo.Ed. 249T

TECHNICAL COMMITTEE REPORT FOR

PRINTING/GRAPHIC ARTS TECHNOLOGY

Invest in Success

IDAHO VTE VOCATIONAL TECHNICAL EDUCATION

STATE DIVISION OF VOCATIONAL EDUCATION

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INTRODUCTION

The curriculum development process undertaken by the Idaho Division of Vocational Education involves the active use of industry personnel. Industry personnel comprise the sole membership on Technical Committees which are responsible for the development of Task Lists for each program. A Technical Committee Report is prepared on completion of the Committee's assignment. This publication is the Technical Committee Report.

The Task List prepared in the Technical Committee Report reflect the current trends and skills necessary for an employee to: 1) Obtain a job in Idaho's industry, 2) retain a job once hired, and, 3) to advance in the occupational field. Task Lists are grouped according to Duty areas generally used in industry settings. Duty areas are used as the basis for modules in the Statewide Curriculum Guide development process. The Technical Committee segment is the single most significant step in the curriculum development process. All future curriculum activities are predicated on the premise that an accurate picture of industry needs are reflected in the Task List.

Instructional personnel are selected to develop the Statewide Curriculum Guide. These instructors write Performance Objectives for each Task and the subsequent Enabling Objectives for each Performance Objective. The committee members prepare all material in a competency-based format so as to have an effective and efficient methodology for determining student progress. The Statewide Guides are designed as the prime determiner of program content. All programs must follow the established Guide in order to be approved for operation. Any deviation from this Guide requires written approval from the respective program supervisor at the Division of Vocational Education. It is not the intent of the Division that all programs be designed to be exactly the same, but assurance is needed to ensure that the program meets the minimum standards for operation, based on the community needs, equipment, and facilities available to the local school or institution.

The Technical Committee Report does not dictate the level of instruction The Task List developed represents the entire occupational field. Schools and Institutions determine what skills can be taught and what depth of instruction can be provided. They must choose the Tasks to be taught from the Technical Committee Report but are free to determine how many or which ones can be incorporated into their program.

The Technical Committee Report is also used as the primary list for generating Student Profiles. These Profiles are used as a cumulative record of each student's progress. They are printed in a folder format and have levels of performance scales for each Task so that student competence can be recorded for individual skills or tasks. This document will become the main component for Articulation activities in the event that the student desires to go on for additional training or education.

ACKNOWLEDGEMENTS

The Technical Committee process involves personnel from industry who are selected by the Division with assistance from the State Council on Vocational Education. People who serve on the Committees are nominated by local administrators. They generally come from local advisory committees for existing Vocational Education programs or are community representatives in a capacity to provide the necessary information about industry needs. These people serve with the approval of their employers and give their time and energies to the project without cost. The Division provides reimbursement for per diem and travel. We are indebted greatly to these industry representatives and to their employers for the resources so freely given to the pursuit of ensuring that Idaho students receive the most current training and education possible and that which is demanded by industry.

To this end, the Division recognizes the following people who served on the Printing/Graphic Arts Technical Committee: Ron Ackerman, Garden City; Blaine Burkman, Pocatello; Kelly Crompton, Pocatello; Jim Ferguson, Boise; Larry Van Quill, Boise; Chuck Turnbow, Lewiston; Vic Walstrom, Caldwell; Bill Wieck, Boise; George Heckenlively, Boise, and Blaine Morgan, Idaho Falls.

Your support and assistance was very greatly appreciated. Your patience for enduring the educaitonal process is also noted. The students and instructional staff will be much more able to accomplish their respective goals as a result of your contributions.

Sho Ueda, Supervisor
Trades, Industrial and Technical Education

Don Eshelby
Director of Program Services

CURRICULUM FRAMEWORK PROGRAM AREA: TRADE AND INDUSTRIAL

IDAHO DIVISION OF VOCATIONAL EDUCATION REVISION DATE: July, 1990

PROGRAM TITLE: PRINTING/GRAPHIC ARTS TECHNOLOGY

IDAHO CODE NUMBER: 6190 CIP: 48.0201

I. MAJOR CONCEPTS/CONTENT: The purpose of this program is to prepare students for employment in the printing industry. This program also provides supplemental training for persons previously or currently employed in this occupation/these occupations.

The course content will include the following: administration, pre-press, press and post-press operations and maintenance, typographic, copy preparation, stripping black and white, line graphic photo processes, offset presswork, estimating, graphic arts halftone processes and color reproduction technology.

The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices. Some instruction on customer relations, sales, and general public relations will be included.

II. LABORATORY ACTIVITIES: Plant or laboratory activities are an integral part of this program. These activities provide instruction in the use of tools, equipment, materials and processes found in the industry. Students are also instructed in the following: customer layouts, composition and camera ready copy; producing line negatives, halftone negatives and contacts; stripping line negatives, halftone negatives, and multicolor and process color; producing printing plates, single color proofs and color proofs; operating and adjusting offset presses; and operating cutting, folding and binding equipment.

III. SPECIAL NOTE: The Vocational Industrial Clubs of America, Inc., is the vocational student organization which reinforces classroom instruction by providing communications, leadership, human relations and employability training experiences. It also reinforces specific vocational skills. When provided, these activities are considered an integral part of this program.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

The typical length of the technical part of this program for the average achieving student at postsecondary level is 1800 hours for certificate, 2250 hours for AAS. The average length for secondary students is 900 hours with multi-period blocks of instruction provided to accomplish a major portion of the listed competencies.

IV. INTENDED OUTCOMES: **After successfully completing this program, the student will be able to demonstrate proficiency in performing:**

01. **Employability skills and habits.**
02. **Introductory Aspects of the Printing Industry**
03. **Skills related to paper characteristics**
04. **Clerical administrative support operations.**
05. **Mechanical/creative support operations.**
06. **Performing pre-press operations.**
07. **Offset press operations.**
08. **Finishing/binding operations.**
09. **Reproduction process operations.**
10. **Estimating operations.**
11. **Graphic design operations.**
12. **Typographical operations.**
13. **Copy preparation operations.**
14. **Line graphic photo operations.**
15. **Graphic arts halftone operations.**
16. **Color reproduction operations.**
17. **Stripping operations.**
18. **Proofing and plate-making operations.**
19. **Offset operations.**
20. **Finishing operations.**

LEVELS OF INSTRUCTION CODES:

E **Student is introduced to the concepts and is familiar with basic operational functions. This level denotes basic instructional content necessary to enter the job market.**

R **Student can perform the activity with minimum supervision. This level denotes instructional level necessary to retain a job after obtaining one and work for a short while.**

A **Student can perform the activity without supervision and will meet industry standards. This level denotes advanced skill training necessary for job retention and promotion.**

STUDENT PERFORMANCE STANDARDS EFFECTIVE DATE: July, 1990

PROGRAM AREA: Trade and Industrial SECONDARY:_____

PROGRAM TITLE:Printing/Graphic Arts Technology POSTSECONDARY:_____

01.0 DEMONSTRATE PROFICIENCY IN PERFORMING EMPLOYABILITY SKILLS AND HABITS - The student will be able to:

E	01.01	Apply basic safety rules.
E	01.02	Follow safety procedures and legal requirements under OSHA or other federal and state regulatory agencies.
E	01.03	Identify employment opportunities
E	01.04	Apply employment seeking skills
E	01.05	Interpret employment capabilities
E	01.06	Demonstrate appropriate work behavior
E	01.07	Maintain safe and healthy environment
E	01.08	Maintain business-like image
E	01.09	Maintain working relationships with others
E	01.10	Communicate on the job
E	01.11	Adapt to change
E	01.12	Understand how a business works
E	01.13	Perform mathematical skills

02.0 DEMONSTRATE A KNOWLEDGE OF INTRODUCTORY ASPECTS OF THE PRINTING INDUSTRY - The student will be able to:

E	02.01	Trace the evolution of writing, kinds of communications, materials used and printing by identifying and recalling times, cultures and specific inventions.
E	02.02	Analyze the various reproduction processes such as: letterpress, gravure, offset lithography, screen, flexography and electronic.
E	02.03	Explain the history of inks, substrates and differences between printing processes.
E	02.04	Explain the organization and management of a well organized printing company by identifying its organizational elements.

03.0 DEMONSTRATE PROFICIENCY IN PERFORMING SKILLS RELATING TO PAPER CHARACTERISTICS - The student will be able to:

E	03.01	Identify characteristics of printing papers to specify basic weights, sizes,grains, finishes and grades.

E	03.02	**Explain the history of paper and basic components in paper by recalling items used in place of paper and identifying the steps used in the manufacture of paper.**
E	03.03	**Apply formula for computing weight of paper stock.**
E	03.04	**Explain the principle characteristics of the different papers used in the printing process.**
E	03.05	**Apply basic principles of offset lithography pertaining to interrelationships of paper (coated and uncoated and various grades within).**
E	03.06	**Apply basic principles of finishing/binding operations pertaining to sheet cutting.**
E	03.07	**Identify basic principles of finishing/binding operations pertaining to grain, caliper and finish (coated or uncoated paper).**
E	03.08	**Identify basic principles of finishing/binding operations pertaining to signature configurations for sheet and web presses.**
R	03.09	**Apply basic principles of finishing/binding operations pertaining to folding.**
R	03.10	**Apply basic principles of finishing/binding operations pertaining to scoring, embossing and perforating.**
E	03.11	**Determine proper and most efficient cut from a parent sheet.**

04.0 <u>DEMONSTRATE PROFICIENCY IN PERFORMING CLERICAL ADMINISTRATIVE SUPPORT OPERATIONS</u> - The student will be able to:

E	04.01	**Establish sequence of job operations.**
E	04.02	**Use printer's measurements to compute inches and fractions, points and picas, decimals, percentages, and proportions.**
E	04.03	**Use job information jacket.**
E	04.04	**Identify characteristics of printing papers to specify basic weights, sizes, and grades.**

05.0 <u>DEMONSTRATE PROFICIENCY IN PERFORMING MECHANICAL/CREATIVE SUPPORT OPERATIONS</u> - The student will be able to:

E	05.01	**Identify the equipment, tools, and materials used in design and copy preparation and the safety rules pertaining to each.**
E	05.02	**Apply basic safety rules.**
E	05.03	**Follow safety procedures and legal requirements under OSHA or other federal and state regulatory agencies.**
E	05.04	**Prepare thumbnail layouts.**
E	05.05	**Prepare rough layouts.**
R	05.06	**Prepare comprehensive layouts including a finished working dummy.**
R	05.07	**Size and proportion photographs, line drawings, and other copy elements.**
R	05.08	**Copyfit and mark up (specify type sizes and styles).**
R	05.09	**Prepare computer typesetting equipment for operation.**
R	05.10	**Operate typesetting equipment.**
R	05.11	**Prepare typesetting processor.**
A	05.12	**Process typeset copy.**

A	05.13	**Proofread typeset output.**
A	05.14	**Paste up mechanical elements including keyline for photographs, tint blocks and ruling.**
A	05.15	**Prepare tissue overlay and specify color break, tint percentages and reverses.**
A	05.16	**Check and compare completed mechanical to comprehensive layouts for final proofing.**
A	05.17	**Perform routine maintenance in accordance with manufacturer specifications and established maintenance schedule.**
E	05.18	**Comply with established waste and spoilage control measures.**

06.0 **DEMONSTRATE PROFICIENCY IN PERFORMING PRE-PRESS OPERATIONS**

The student will be able to:

E	06.01	**Apply basic safety rules.**
E	06.02	**Follow safety procedures and legal requirements under OSHA or other federal and state regulatory agencies.**
E	06.03	**Identify the equipment and materials used in reproduction photography and the safety rules pertaining to each.**
E	06.04	**Apply basic principles of photosensitometry, orthochromatic, and panchromatic (including use of gray scale).**
R	06.05	**Apply basic principles of light pertaining to copy board illuminations and exposure calculations for all camera functions.**
R	06.06	**Apply basic principles of camera optics as pertains to exposure control and focus, and camera extensions pertaining to reductions and enlargements.**
E	06.07	**Identify the parts of the process camera and explain their use.**
E	06.08	**Apply basic principles of darkroom chemistry.**
E	06.09	**Prepare darkroom chemistry.**
E	06.10	**Establish basic line exposure and exposure time at 100 percent using standard time and temperature development.**
E	06.11	**Apply basic principles of halftone computer and density guide.**
E	06.12	**Establish basic exposures to determine screen range, basic flash, main exposure, and bump exposure at 100 percent using standard time and temperature development.**
E	06.13	**Produce line negatives to size.**
E	06.14	**Inspect and compare line negatives to original mechanical.**
E	06.15	**Produce halftones to size.**
E	06.16	**Inspect and compare halftones to original copy.**
E	06.17	**Make line and halftone diffusion transfer prints.**
E	06.18	**Inspect and compare prints to original mechanical.**
R	06.19	**Apply basic principles of additive and subtractive color pertaining to the use of filters.**
R	06.20	**Use filters to hold/delete colors on line shots at 100 percent using standard time and temperature development.**
E	06.21	**Identify the parts of a contact frame and point light source and explain their use.**
R	06.22	**Produce contacts using orthochromatic and duplicating film, transmission density guide and standard time and temperature development.**

E	06.23	**Identify equipment and materials used in the stripping function and the safety rules pertaining to each.**
E	06.24	**Apply basic principles of stripping using a T-square and triangle to align, position, and tape film on ruled or unruled plastic or paper masking sheets; open windows; and opaque.**
E	06.25	**Strip l-color, l-up layouts.**
R	06.26	**Strip l-color, step layouts.**
R	06.27	**Strip l-color, 4-page layouts.**
R	06.28	**Strip l-color, 8-page layouts.**
R	06.29	**Strip multiple burn layout (halftone and screen tints).**
A	06.30	**Strip multiple color process layouts.**
E	06.31	**Apply basic step and repeat procedures.**
E	06.32	**Inspect and compare flats to original mechanical.**
E	06.33	**Identify equipment and materials used in proofing and platemaking to obtain proper exposures using a transmission density guide for processing photosensitive subtractive, paper or metal and photo direct plates.**
R	06.34	**Produce proofs on diazo, silver paper and color proof material.**
R	06.35	**Process proofs.**
R	06.36	**Inspect and compare proofs to the original mechanical.**
E	06.37	**Produce subtractive, paper or metal and photo direct plates.**
E	06.38	**Process plates.**
E	06.39	**Inspect and compare plates to proofs.**
E	06.40	**File, handle, and retrieve flats and plates.**

07.0 DEMONSTRATE PROFICIENCY IN PERFORMING OFFSET PRESS OPERATIONS - **The student will be able to:**

E	07.01	**Apply basic safety rules.**
E	07.02	**Follow safety procedures and legal requirements under OSHA or other federal and state regulatory agencies.**
E	07.03	**Identify the equipment and material used in offset press operations, their parts and functions, and the safety rules relating to their operation.**
E	07.04	**Apply basic principles of offset lithography pertaining to physical and chemical properties of ink components (pigment, vehicle, and dryer).**
E	07.05	**Apply basic principles of offset lithography pertaining to dampening systems (ducted and continuous).**
E	07.06	**Apply basic principles of offset lithography pertaining to chemical components of fountain solutions (acid, alkaline, and neutral).**
E	07.07	**Apply basic principles of offset lithography pertaining to ph and conductivity control and demonstrate its effects on the lithographic process.**
E	07.08	**Apply basic principles of offset lithography pertaining to interrelationships upon the process of paper (coated and uncoated and various grades within).**
E	07.09	**Apply basic principles of offset lithography pertaining to the inter-relationships of textured or smooth paper; paper, plastic, metal plates; and conventional or compressible blankets.**

R	07.10	**Apply basic principles of offset lithography pertaining to ink and its drying properties in relation to fountain solution, plate and paper used (including effects of ink film thickness and drying time and set off; and problems associated with inappropriate use of spray powder).**
E	07.11	**Apply basic principles of plate preservation after presswork for long-term storage (use of gum arabic and asphaltum).**
E	07.12	**Prepare press for operation by reviewing job-ticket specifications and then selecting appropriate press and materials.**
E	07.13	**Prepare press for operation based on interrelationships of lithographic process.**
R	07.14	**Mix fountain solution from concentrate.**
R	07.15	**Mix ink to PMS (Pantone Matching System) specifications.**
E	07.16	**Introduce ink and fountain solution to press in proper sequence.**
R	07.17	**Set up and adjust feeder to paper specifications (air blast, vacuum, and double sheet eliminator).**
R	07.18	**Set up and adjust register system to single sheet or stream fed, side guide, and head register.**
R	07.19	**Set up and adjust delivery (chute or chain).**
R	07.20	**Mount blanket (pack if necessary) and adjust to press specifications.**
R	07.21	**Set impression cylinder to paper thickness and press specifications.**
R	07.22	**Set and adjust ink and water rollers pressures to press specifications.**
R	07.23	**Make-ready press to assure ink and water balance for uniform coverage, volume and replenishment of ink, image position, cylinder pressure, and sheet registration.**
E	07.24	**Inspect and evaluate final make-ready sheet to job-ticket specifications and obtain proof approval to run.**
R	07.25	**Set spray powder.**
E	07.26	**Produce required number of press sheets to job-ticket specifications.**
E	07.27	**Preserve plate for long-term storage.**
E	07.28	**Perform press wash-up.**
R	07.29	**Perform press maintenance to manufacturer's specifications.**

08.0 **<u>DEMONSTRATE PROFICIENCY IN PERFORMING FINISHING/BINDING OPERATIONS</u> - The student will be able to:**

E	08.01	**Apply basic safety rules.**
E	08.02	**Follow safety procedures and legal requirements under OSHA or other federal and state regulatory agencies.**
E	08.03	**Identify the equipment and materials used in finishing/binding operations, their parts and functions, and the safety rules relating to their operation.**
R	08.04	**Setup, operate, and maintain bindery equipment.**
A	08.05	**Apply basic principles of finishing/binding operations pertaining to pre-press paper cutting, post press paper cutting and post bindery cutting (after folding, stitching, etc).**
R	08.06	**Apply basic principles of finishing/binding operations pertaining to sheet cutting.**
A	08.07	**Apply basic principles of finishing/binding operations pertaining to grain, caliper, and finish (coated or uncoated) of paper.**

R	08.08	**Apply basic principles of finishing/binding operations pertaining to signature configurations.**
R	08.09	**Apply basic principles of finishing/binding operations pertaining to knife and buckle folding.**
R	08.10	**Apply basic principles of finishing/binding operations pertaining to scoring and perforating.**
E	08.11	**Apply basic principles of finishing/binding operations pertaining to collating and gathering.**
R	08.12	**Apply basic principles of finishing/binding operations pertaining to binding alternatives (saddle, side, perfect, comb, spiral, case, etc.).**
E	08.13	**Apply basic principles of finishing/binding operations pertaining to adhesive binding (padding and fan-apart).**
E	08.14	**Apply basic principles of finishing/binding operations pertaining to packaging and identification.**
E	08.15	**Demonstrate methods of counting sheets (machine, measurement, weight, and rapid multiple-sheet counting by fives).**
E	08.16	**Hand-jog 8 1/2" x 11" sheets.**
E	08.17	**Hand-jog 17" x 22" and larger sheets.**
E	08.18	**Machine jog sheets.**
E	08.19	**Prepare rule-out of press sheet for finishing operations according to job-ticket specifications and approved proof.**
R	08.20	**Set up and operate cutter in accordance with rule-out.**
R	08.21	**Prepare folding dummy from press sheet in accordance with job-ticket specifications and folding dummy.**
R	08.22	**Set up and operate folder in accordance with job-ticket specifications and folding dummy.**
E	08.23	**Make a single fold.**
R	08.24	**Make a multiple parallel fold.**
R	08.25	**Make a right angle fold.**
R	08.26	**Identify slitting, perforating, and scoring functions pertaining to folding operations.**
E	08.27	**Describe the process for collating flat sheets.**
E	08.28	**Describe the process for gathering of signatures.**
E	08.29	**Set up and operate stitcher (side and saddle).**
E	08.30	**Set up and operate comb binding machine.**
E	08.31	**Perform paper padding functions.**
E	08.32	**Define perfect, spiral, and case binding.**
E	08.33	**Set up and operate a paper drill for standard looseleaf binder.**
E	08.34	**Define die-cutting, embossing, foil stamping, and numbering.**

09.0 **<u>PERFORM REPRODUCTION PROCESS OPERATIONS</u> - The student will be able to:**

E	09.01	**Apply basic safety rules.**
E	09.02	**Follow safety procedures and legal requirements under OSHA or other federal and state regulatory agencies.**
E	09.03	**Identify the equipment and materials used in reproduction process operations, their parts and functions and the safety rules relating to their operation.**

E	09.04	**Compare and contrast the various reproduction of elements in each reproduction process to distinguish the strengths and weaknesses of each.**
E	09.05	**Explain the value of planning and design to the graphic communication process by identifying principles of design and the steps used in the planning of layouts.**
R	09.06	**Distinguish between various printing surfaces by contrast and comparison to a variety of elements in each process.**
E	09.07	**Evaluate printing processes by judging advantages and disadvantages of each.**
E	09.08	**Define terms used in mark-up of copy for composition by being able to recognize marks, instructions and other data.**
E	09.09	**Place in sequential order the production steps of a printing job from conception to completion.**
E	09.10	**Define terms used in making a paste-up or mechanical.**
E	09.11	**Describe the elements of typography and their value to the printing and design process.**
E	09.12	**Explain typographic terms.**
R	09.13	**Analyze the current systems of composition by comparison and contrast and by being able to categorize and distinguish each.**
E	09.14	**Define the terms and methodology used in commercial and process photography as they relate to the printing processes.**
E	09.15	**Describe plates used in the letterpress, gravure, offset lithography, screen, electronic, and flexography printing processes.**
E	09.16	**Explain the principles and generalizations in the use of color in design of printing.**
E	09.17	**Explain the use of inks, substrates and differences between printing processes.**
R	09.18	**Setup and operate machines used in the reproduction process in accordance with manufacturer's specifications.**
R	09.19	**Perform operator maintenance on machines used in the reproduction processes in accordance with manufacturer's specifications.**

10.0 **PERFORMING ESTIMATING OPERATIONS - The student will be able to:**

E	10.01	**Follow safety procedures and legal requirements under OSHA or other federal and state regulatory agencies.**
E	10.02	**Identify the equipment and materials used in estimating operations, their parts and functions.**
E	10.03	**Explain the methods of reproduction illustrated by offset and letter press.**
E	10.04	**Explain the role and responsibility of the estimator in a printing plant.**
E	10.05	**Explain the sources of information available to the estimator.**
E	10.06	**Explain the factors that must be considered by the estimator in preparing an estimate such as standard production times, budgeted hour cost rates, outside purchased services, and material costs.**
E	10.07	**Define terms used in estimating.**
E	10.08	**Place in sequential order the progressive steps for preparing an estimate.**
E	10.09	**List the job tasks that usually appear on an estimating form in the sequential order in which they are usually performed.**
E	10.10	**Apply formula for computing weight of paper stock.**
E	10.11	**Calculate the optimal cut from a parent sheet.**

E	10.12	Explain the principle characteristics of the different papers used in the printing process.
R	10.13	Prepare cost estimates utilizing given items, costs and specifications for a one-color, one-up job.
R	10.14	Prepare cost estimates utilizing given items, costs and specifications for a one-color, step job.
R	10.15	Prepare cost estimates utilizing given items, costs and specifications for a one-color, four-page job.
R	10.16	Prepare cost estimates utilizing given items, costs and specifications for a one-color, eight-page job.
A	10.17	Prepare cost estimates utilizing given items, costs and specifications for a 4 over 4, sixteen-page folded, saddle stitched job.

11.0 PERFORM GRAPHIC DESIGN OPERATIONS - The student will be able to:

E	11.01	Apply basic safety rules.
E	11.02	Follow safety procedures and legal requirements under OSHA or other federal and state regulatory agencies.
E	11.03	Identify the equipment and materials used in graphic design operations, their parts and functions and the safety rules relating to their operation.
R	11.04	Setup and operate graphic design operation tools and mechanical equipment.
	11.05	Evaluate when to use mechanical procedures compared to computer-aided procedures.
R	11.06	Setup and operate computer-aided design system.
R	11.07	Perform operator maintenance on graphic design equipment.
	11.08	Prepare thumbnail layout.
	11.09	Prepare rough layouts using both mechanical and computer-aided methods.
	11.10	Prepare comprehensive layout including finish working dummy using both mechanical and computer-aided methods.
	11.11	Crop, size, and proportion photographs, line drawings and other copy elements using both mechanical and computer-aided methods.
	11.12	Copyfit and mark up (specify type sizes and styles) using both mechanical and computer-aided methods.
	11.13	Evaluate basic elements of design; spatial relationships, color compatibility and contrast, emphasis and continuity of elements and specific needs of forms design.

12.0 PERFORMING TYPOGRAPHICAL OPERATIONS - The student will be able to:

E	12.01	Apply basic safety rules.
E	12.02	Follow safety procedures and legal requirements under OSHA or other federal and state regulatory agencies.
E	12.03	Identify the equipment and materials used in typographical operations, their parts and functions and the safety rules relating to their operation.
A	12.04	Setup and operate typographical tools and equipment.
R	12.05	Perform operator maintenance on typographical equipment.
E	12.06	Define typographic terms for measurement.
E	12.07	Proofread type by a variety of means.

E	12.08	**Solve printing measurement problems using a group of specific facts, a system of logic and arithmetic based on printer's measurements.**
A	12.09	**Setup and operate typesetting machines and desktop software programs.**
E	12.10	**Evaluate printed typed samples for visual spacing to identify kerning problems specific to letter combinations, type styles, faces and sizes and produce corrected samples.**
E	12.11	**Define terms used in typesetting and typography and explain the difference.**
E	12.12	**Define terms that deal with type identification.**
E	12.13	**Explain the elements of typography and their values in printing and design.**
E	12.14	**Solve copyfitting problems by applying typographic principles.**
E	12.15	**Evaluate typesetting systems by judging their advantages and their disadvantages.**
E	12.16	**Apply the principles of several copyfitting systems for counting manuscripts by predicting keystrokes in each system.**
E	12.17	**Perform manual, automatic and semi-automatic justification decisions.**

13.0 PERFORMING COPY PREPARATION OPERATIONS - **The student will be able to:**

E	13.01	**Apply basic safety rules.**
E	13.02	**Follow safety procedures and legal requirements under OSHA or other federal and state regulatory agencies.**
E	13.03	**Identify the equipment and materials used in copy preparation operations, their parts and functions and the safety rules relating to their operation.**
E	13.04	**Setup and operate copy preparation tools and mechanical equipment.**
E	13.05	**Perform operator maintenance on copy preparation equipment.**
E	13.06	**Explain the scope and purpose of copy preparation.**
E	13.07	**Define terms used in copy preparation.**
E	13.08	**Apply the principles of computer-aided copy preparation using color separation, chokes and spreads, electronic masking and mechanical or electronically generated color proofs of output.**
E	13.09	**Apply the principles of mechanical paste-up using printed type proofs.**
E	13.10	**Demonstrate how to scale by diagonal line methods.**
E	13.11	**Demonstrate the use of the proportion wheel.**
E	13.12	**Demonstrate layout for mechanicals.**
E	13.13	**Explain the different types of light sensitive materials used on copy preparation.**
E	13.14	**Demonstrate the elements of mechanical masking.**
E	13.15	**Demonstrate the use of a process color chart such as a Murphy color wheel when specifying color breaks.**
E	13.16	**Demonstrate the use of amberlith by cutting to the specific areas where color is to be masked in basic art drawings.**
E	13.17	**Demonstrate application of room light film materials.**
E	13.18	**Paste up mechanical elements including keyline for photographs and tint blocks; and ruling.**
E	13.19	**Prepare tissue overlay and specify color break, tint percentages, and reverses.**
E	13.20	**Check and compare completed mechanical to comprehensive layout for final proofing.**
E	13.21	**Evaluate differences in mechanical and computer-aided copy preparation by judging their advantages and disadvantages.**

14.0 PERFORMING LINE PHOTOGRAPHIC OPERATIONS - The student will be able to:

E	14.01	Apply basic safety rules.
E	14.02	Follow safety procedures and legal requirements under OSHA or other federal and state regulatory agencies.
E	14.03	Identify the equipment and materials used in line photographic operations, their parts and functions and the safety rules relating to their operations.
E	14.04	Setup and operate line photographic tools and equipment.
E	14.05	Perform operator maintenance on-line photographic equipment.
E	14.06	Solve lithographic scaling problems by analyzing facts, calculating proper sizes or percentages and stating solutions in appropriate terms.
E	14.07	Explain the photographic process.
E	14.08	Define terms relating to film construction.
E	14.09	Explain characteristics of film relating to speed, contrast and color.
E	14.10	Define terms relating to line photography.
E	14.11	Define terms relating to electromagnetic energy and spectrum.
E	14.12	Demonstrate the application and alignment of camera planes and working parts.
E	14.13	Operate a process camera by making various adjustments and by making a series of negatives to produce appropriate results using a variety of photographic materials.
E	14.14	Demonstrate the application and limitation of the relationship between time, f/stop, exposure and light intensity by using a reflection density guide and interpreting results.
E	14.15	Define specific terms in relation to a process camera lens.
E	14.16	Explain lens aberrations and flare.
E	14.17	Define and explain the law of inverse squares, law of reflection, and law of refraction and light.
E	14.18	Demonstrate application and limitation of the relationship between bellows extension, exposure and f/stops by using formulas, charts, diaphragm control systems, and interpret results.
E	14.19	Demonstrate the mixing of photographic chemicals for processing of photographic materials by identifying ratios, recognizing terms and different chemicals and mixing them when necessary.
E	14.20	Operate a vacuum frame and use a variety of films, copy and procedures.
E	14.21	Demonstrate application and procedures to produce film negatives and positives with a variety of films, equipment and conditions.
E	14.22	Demonstrate the use of a density guide by being able to explain changes in density and by confirming them in laboratory practice.
E	14.23	Define terms relating to photographic filters used in process photography.
E	14.24	Demonstrate the use of filters in laboratory projects.
E	14.25	Explain the need and value of establishing and maintaining standardized procedures.
E	14.26	Demonstrate proper cropping techniques.

15.0 PERFORMING GRAPHIC ARTS HALFTONE OPERATIONS

The student will be able to:

E	15.01	**Apply basic safety rules.**
E	15.02	**Follow safety procedures and legal requirements under OSHA or other federal and state regulatory agencies.**
E	15.03	**Identify the equipment and materials used in graphic arts halftone operations, their parts and functions and the safety rules relating to their operation.**
E	15.04	**Setup and operate graphic arts halftone tools and equipment.**
E	15.05	**Perform operator maintenance on graphic arts halftone equipment.**
E	15.06	**Define halftone terminology.**
E	15.07	**Calibrate a reflection densitometer to manufacturer's specifications.**
E	15.08	**Compare and contrast the function of the reflection densitometer with the Density Guide.**
E	15.09	**Solve a variety of exposure problems using an exposure computer.**
E	15.10	**Solve a variety of exposure problems using neutral density filters.**
E	15.11	**Demonstrate use of a variety of special films such as litho, pan, rapid access and room light.**
E	15.12	**Evaluate a typical printed halftone under normal laboratory conditions and determine the best possible exposure combination to help establish laboratory standard halftone photography.**
E	15.13	**Develop sets of directions for the major basics of halftone photography, basic exposure, basic density range of the contact screen, basic density of the copy, basic flash and basic material on which to print.**
E	15.14	**Solve a variety of problems by applying the principles of densitometry and exposure.**
E	15.15	**Demonstrate proper cropping technique.**

16.0 PERFORMING COLOR REPRODUCTION OPERATIONS - **The student will be able to:**

E	16.01	**Apply basic safety rules.**
E	16.02	**Follow safety procedures and legal requirements under OSHA or other federal and state regulatory agencies.**
E	16.03	**Identify the equipment and materials used in color reproduction operations, their parts and functions and the safety rules relating to their operation.**
R	16.04	**Setup and operate color reproduction tools and equipment.**
R	16.05	**Perform operator maintenance on color reproduction equipment.**
R	16.06	**Apply the principles of visible light by constructing a spectrograph and placing the major subdivisions of white light in their proper position according to scientific theory.**
R	16.07	**Explain the interrelationship of light and color.**
R	16.08	**Explain the principles of color theory as they apply to process printing.**
R	16.09	**Explain the difference between additive and subtractive color.**
R	16.10	**Explain the color absorption/reflection theory as it applies to process color filters and printing inks.**
R	16.11	**Compare and contrast color separation systems for direct, indirect and electronic scanning.**

R	16.12	**Interpret manufacturer's film data sheets of various applicable films.**
R	16.13	**Define densitometry and sensitometry.**
R	16.14	**Apply the principles of densitometry and sensitometry to establish local laboratory standards.**
R	16.15	**Explain the requirements for photographic color separation by listing the materials, equipment, facilities and special considerations required in the process.**
R	16.16	**Explain the requirements for color production by graphing and interpreting the deficiencies of printing inks.**

17.0 PERFORMING STRIPPING OPERATIONS - The student will be able to:

E	17.01	**Apply basic safety rules.**
E	17.02	**Follow safety procedures and legal requirements under OSHA or other federal and state regulatory agencies.**
E	17.03	**Identify the equipment and materials used in stripping operations, their parts and functions and the safety rules relating to their operation.**
E	17.04	**Setup and operate stripping operation tools and equipment.**
E	17.05	**Perform operator maintenance on stripping operations equipment.**
E	17.06	**Define terms used in stripping.**
E	17.07	**Analyze the various approaches to stripping by comparing and contrasting preprinted masking sheets with conventional nonprinted masking sheets.**
E	17.08	**Identify the parts of a contact frame and point light source and explain their use.**
E	17.09	**Produce contacts using orthochromatic and duplicating film using transmission density guide and standard time and temperature development.**
E	17.10	**Identify equipment and materials used in the stripping function and the safety rules pertaining to each.**
E	17.11	**Apply basic principles of stripping using: T-square and triangle to align, position and tape film.**
E	17.12	**Prepare working dummy and produce a one-color, one-up layout.**
E	17.13	**Prepare working dummy and produce a one-color, multiple layout.**
E	17.14	**Explain methodology relating to step-and-repeat by choosing or recognizing the different procedures relating to particular situations.**
R	17.15	**Prepare working dummy and produce a one-color, step layout.**
R	17.16	**Prepare working dummy and produce a one-color, four-page layout.**
R	17.17	**Produce chokes, spreads, and knockouts.**
R	17.18	**Prepare working dummy and produce a one-color, eight-page layout.**
R	17.19	**Demonstrate the cutting of rubylith masks by trapping to key line negatives.**
R	17.20	**Prepare a working dummy and apply principles of a pin-register system to produce a multiple-burn exposure layout (halftone and screen tints).**
R	17.21	**Prepare a working dummy and apply principles of a pin-register.**
R	17.22	**Produce film composites of four color process with 1, 2 and 4 page layout.**
R	17.23	**Inspect and evaluate flats to original mechanical.**
R	17.24	**Apply the principles of computer-aided copy preparation using color separation, chokes and spreads, electronic masking and mechanical or electronically generated color proofs of output.**

18.0 PERFORM PROOFING & PLATEMAKING OPERATIONS

The student will be able to:

E	18.01	**Apply basic safety rules.**
E	18.02	**Follow safety procedures and legal requirements under OSHA or other federal and state regulatory agencies.**
E	18.03	**Identify the equipment and materials used in proofing and platemaking operations, their parts and functions and the safety rules relating to their operation.**
E	18.04	**Setup and operate proofing and platemaking tools and equipment.**
E	18.05	**Perform operator maintenance on proofing and platemaking equipment.**
E	18.06	**Identify equipment and materials used in proofing and platemaking to obtain proper exposures using a transmission density guide.**
E	18.07	**Produce proofs on diazo, silver and color proofing materials.**
E	18.08	**Inspect and evaluate proofs to original mechanical.**
E	18.09	**Identify, contrast and compare image carriers such as paper, photo direct, foil, and aluminum subtractive for run length and quality to suit customer specifications.**
E	18.10	**Process paper, photo direct, foil, and aluminum subtractive image carriers to manufacturer specifications.**
E	18.11	**Inspect and evaluate plates to proofs.**
E	18.12	**File, handle and retrieve flats and plates.**

19.0 PERFORM OFFSET OPERATIONS - **The Student will be able to:**

E	19.01	**Apply basic safety rules.**
E	19.02	**Follow safety procedures and legal requirements under OSHA or other federal and state regulatory agencies.**
E	19.03	**Identify the equipment and materials used in offset presswork operations, their parts and functions and the safety rules relating to their operation.**
R	19.04	**Setup and operate offset press equipment.**
R	19.05	**Perform operator maintenance on offset press equipment.**
E	19.06	**Explain the basic principles of the lithographic process.**
E	19.07	**Compare and contrast a single-sheet feeder, stream-fed, web-fed systems.**
E	19.08	**Compare and contrast delivery systems for sheet- and web-fed systems.**
E	19.09	**Compare and contrast register systems such as side-guide, pull-guide, and head register.**
E	19.10	**Compare and contrast ink and moisture system for sheet- and web-fed systems.**
E	19.11	**Explain make-ready procedures in proper sequence in preparation for actual production.**
R	19.12	**Apply basic principles of offset lithography pertaining to dampening systems (ducted and continuous).**
R	19.13	**Apply basic principles of offset lithography pertaining to chemical components of fountain solutions (acid, alkaline, and neutral).**
E	19.14	**Apply basic principles of offset lithography pertaining to ph and conductivity control and demonstrate its effects on the lithographic process.**
E	19.15	**Apply basic principles of offset lithography pertaining to interrelationships of paper (coated and uncoated and various grades within).**

A	19.16	**Demonstrate the inking system by identifying each part and making proper adjustments.**
R	19.17	**Make ready and demonstrate feeder and delivery systems.**
A	19.18	**Demonstrate methods for achieving register by making machine adjustments.**
R	19.19	**Apply basic principles of offset press operations to produce work and turn, work and tumble and sheetwise printed products.**

20.0 PERFORM FINISHING OPERATIONS - The student will be able to:

E	20.01	**Apply basic safety rules.**
E	20.02	**Follow safety procedures and legal requirements under OSHA or other federal and state regulatory agencies.**
E	20.03	**Identify the equipment and materials used in finishing/binding operation, their parts and functions and the safety rules relating to their operation.**
R	20.04	**Apply basic principles of finishing/binding operations pertaining to prepress paper cutting, post press paper cutting and post bindery cutting (after folding, stitching, etc.).**
R	20.05	**Apply basic principles of finishing/binding operations pertaining to sheet cutting.**
E	20.06	**Identify basic principles of finishing/binding operations pertaining to grain, caliper and finish (coated or uncoated or paper).**
E	20.07	**Identify basic principles of finishing/binding operations pertaining to signature configurations for sheet and web presses.**
R	20.08	**Apply basic principles of finishing/binding operations pertaining to folding.**
R	20.09	**Apply basic principles of finishing/binding operations pertaining to scoring and perforating.**
R	20.10	**Apply basic principles of finishing/binding operations pertaining to collating and gathering.**
E	20.11	**Apply basic principles of finishing/binding operations pertaining to binding alternatives (saddle, side, perfect, comb, spiral, case, etc.).**
E	20.12	**Apply basic principles of finishing/binding operations pertaining to adhesive binding (padding and fan-apart).**

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